CLAIMS

What is claimed is:

1. A method for refining image data from measured projection data acquired from a computed tomographic scanner comprising:

receiving the measured projection data from the computed tomographic scanner;

reconstructing the measured projection data to generate initial reconstructed image data;

partitioning the initial reconstructed image data into a plurality of regions based on image data quality, to generate partitioned reconstructed image data, wherein the plurality of regions comprise a good image data quality volume and a poor image data quality volume; and

refining the image data quality of the partitioned reconstructed image data to generate an improved reconstructed image data.

2. The method of claim 1, wherein the measured projection data comprises cone beam projections.

3. The method of claim 1, wherein reconstructing the measured projection data to generate the initial reconstructed image data is performed using an analytic reconstruction algorithm.

4. The method of claim 3, wherein the analytic reconstruction algorithm comprises a cone beam filtered backprojection reconstruction algorithm to generate the initial reconstructed image data.

5. The method of claim 1, wherein partitioning the initial reconstructed image data into a plurality of regions based on image data quality is based on a reconstruction volume generated by the initial reconstructed image data.

6. The method of claim 1, wherein refining comprises iteratively computing voxel values of the poor image data quality volume.

7. The method of claim 6, further comprising reprojecting the portion of the good image data quality volume to generate good image data quality reprojection data, and reprojecting the poor image data quality volume to generate poor image data quality volume reprojection data.

8. The method of claim 7, further comprising combining the good image data quality reprojection data with the poor image data quality volume reprojection data to generate a combined reprojection data.

9. The method of claim 8, further comprising iteratively reprojecting the poor image data quality volume.

10. The method of claim 8, further comprising comparing the combined reprojection data with the measured projection data to generate a correction term for the poor image data quality volume, wherein the correction term is a measure of the desired image data quality to be attained by the poor image data quality volume.

11. The method of claim 10, further comprising iteratively updating the poor image data quality volume reprojection image data until the correction term attains a pre-determined value.

12. The method of claim 9, wherein iteratively updating the poor image data quality volume comprises using a maximum likelihood transmission iterative reconstruction algorithm.

13. A method of refining image data of an object based on a reconstruction volume generated by initial reconstructed image data of a computed tomographic scanner, comprising:

partitioning the reconstruction volume into a first volume in which radiation paths from a central portion of a radiation beam generated by the computed tomographic scanner intersect radiation paths from diametrically opposed source positions, and a second volume in which radiation paths from an outer portion of a radiation beam generated by the computed tomographic scanner do not intersect radiation paths from diametrically opposed source positions;

partitioning the first volume into a first portion and a second portion;

computing voxel values for voxels of the first volume;

computing voxel values for voxels of the second volume; and

iteratively computing voxel values for voxels of the second volume to generate a refined image data of the object.

14. The method of claim 13, wherein computing voxel values for the voxels of the second volume comprises reprojecting the voxels of the second volume.

15. The method of claim 13, wherein computing voxel values for the voxels of the second volume comprises reprojecting the voxels of the secondvolume, to generate intersection portion reprojection data.

16. The method of claim 13, wherein the initial reconstructed image data is generated using an analytic reconstruction algorithm.

17. The method of claim 14, wherein reconstructing the voxels of the first volume comprises using an analytic reconstruction algorithm.

18. The method of claim 15, wherein reprojecting the second volume to generate an intersection portion reprojection data comprises using an analytic reconstruction algorithm to form an initial estimate.

19. The method of claim 16, wherein the analytic reconstruction algorithm comprises using a cone beam filtered backprojection reconstruction algorithm.

20. The method of claim 13, wherein iteratively computing voxel values for the voxels of the second volume comprises iteratively correcting the voxels of the second volume, wherein the correction is based upon a comparison between simulated values of projection data and measured projection data.

21. The method of claim 20, wherein iteratively correcting voxel values for the voxels of the second volume comprises using a maximum likelihood transmission iterative reconstruction algorithm.

22. A method for refining image data generated by a computed tomography system comprising:

processing a plurality of electrical signals corresponding to radiation beams generated by the computed tomography system to generate a plurality of projection measurements, wherein the processing comprises performing calculations on the projection measurements to generate reconstruction volume data and wherein the calculations comprise partitioning the reconstruction volume data into a plurality of regions based on image data quality.

23. The method of claim 22, wherein image data for a first volume of the reconstruction volume data is calculated based upon an analytical reconstruction algorithm, and image data for a second volume of the reconstruction volume data is iteratively calculated.

24. The method of claim 23, wherein the analytical reconstruction algorithm comprises a cone beam filtered backprojection reconstruction algorithm.

25. The method of claim 23, wherein the second volume of the reconstruction volume data is iteratively calculated using a maximum likelihood transmission reconstruction algorithm.

26. A computed tomography system for refining image data, the computed tomography system comprising:

an X-ray source configured to project a plurality of X-ray beams through the object;

a detector configured to produce a plurality of electrical signals corresponding to the X-ray beams; and

a processor configured to process the electrical signals to generate a plurality of projection measurements, wherein the processor is configured to perform calculations on the projection measurements to generate reconstruction volume data and wherein the calculations comprise partitioning the reconstruction volume data into a plurality of regions based on image data quality.

27. The system of claim 26, wherein the X-ray source comprises cone beam projections.

28. The system of claim 26, wherein the processor is further configured to compute image data for a first volume of the reconstruction volume data based upon an analytical reconstruction algorithm, and to compute image data for a second volume of the reconstruction volume data iteratively.

29. The system of claim 28, wherein the analytical reconstruction algorithm comprises using a cone beam filtered backprojection reconstruction algorithm.

30. The system of claim 28, wherein the second volume of the reconstruction volume data is iteratively calculated using a maximum likelihood transmission reconstruction algorithm.

31. A computed tomography system for refining image data, the computed tomography system, comprising:

a processor configured to refine the image data based on a reconstruction volume generated from initial reconstructed image data of the computed tomographic

scanner, wherein the processor is further configured to partition the reconstruction volume into a first volume in which radiation paths from a first portion of a radiation beam generated by the computed tomographic scanner intersect radiation paths from diametrically opposed source positions, and a second volume in which radiation paths from an outer portion of a radiation beam generated by the computed tomographic scanner do not intersect radiation paths from diametrically opposed source positions, to partition the first volume into first and second portions, to compute voxel values for voxels of the first volume; to compute voxel values for voxels of the second volume; and to iteratively compute voxel values for voxels of the second volume to generate refined image data.

32. The system of claim 31, wherein the processor is configured to generate the initial reconstructed image data, the first volume and the second volume using an analytic reconstruction algorithm.

33. The system of claim 32, wherein the analytic reconstruction algorithm comprises a cone beam filtered backprojection reconstruction algorithm.

34. The system of claim 31, wherein the processor is configured to iteratively compute voxel values for voxels of the second volume based upon an iterative comparison between simulated values of projection data and measured projection data.

35. The system of claim 34, wherein the processor is configured to iteratively compute voxel values for the voxels of the second volume using a maximum likelihood transmission iterative reconstruction algorithm.

36. A computed tomography system for refining image data, the computed tomography system comprising,

means for partitioning a reconstruction volume into a first volume in which radiation paths from a central portion of a radiation beam generated by the computed tomographic scanner intersect radiation paths from diametrically opposed source

positions, and a second volume in which radiation paths from an outer portion of a radiation beam generated by the computed tomographic scanner do not intersect radiation paths from diametrically opposed source positions, wherein the second volume comprises an intersection portion of voxels;

means for partitioning the first volume into first and second portions;

means for computing voxel values for voxels of the first volume;

means for computing voxel values for voxels of the second volume; and

means for iteratively computing voxel values for voxels of the second volume to generate a refined image data of the object.

37. A system for refining an image data of an object generated by a computed tomography system comprising:

means for processing a plurality of electrical signals corresponding to radiation beams generated by the computed tomography system to generate a plurality of projection measurements, wherein the processing comprises performing calculations on the projection measurements to generate reconstruction volume data of the object and wherein the calculations comprise partitioning the reconstruction volume data into a plurality of regions based on image data quality.

38. At least one computer-readable medium storing computer instructions for instructing a computer system to refine image data, the computer instructions comprising,

partitioning a reconstruction volume into a first volume in which radiation paths from a central portion of a radiation beam generated by the computed tomographic scanner intersect radiation paths from diametrically opposed source positions, and a second volume in which radiation paths from an outer portion of a radiation beam generated by the computed tomographic scanner intersect radiation paths from diametrically opposed source positions, wherein the second volume comprises an intersection portion of voxels;

partitioning the first volume into first and second portions;

computing voxel values for voxels of the first volume;

computing voxel values for voxels of the second volume; and

iteratively computing voxel values for voxels of the second volume to generate a refined image data of the object.

39. At least one computer-readable medium storing computer instructions for instructing a computer system to refine an image data of an object, the computer instructions comprising:

processing a plurality of electrical signals corresponding to radiation beams generated by the computed tomography system to generate a plurality of projection measurements, wherein the processing comprises performing calculations on the projection measurements to generate reconstruction volume data of the object and wherein the calculations comprise partitioning the reconstruction volume data into a plurality of regions based on image data quality.